5.10 Archaeological Heritage

5.10.1 Introduction

The proposed development will consist of the construction of a new berth and mooring dolphins that will facilitate the docking of large scale cruise ships. Associated channel dredging within the harbour will be required, along with a dredged turning circle outside of the harbour mouth; a dredged sea access navigation channel is also proposed to ensure that access and egress of large scale cruise ship within the harbour can be accommodated at the various tide states.

Dun Laoghaire Harbour Company has engaged IAC Ltd to conduct an archaeological assessment, a programme of marine geophysical survey and an archaeological dive inspection of specific sites within or adjacent to the footprint of the proposed development area, which are thought to possess archaeological potential. This study determines, as far as reasonably possible from existing records, the nature of the archaeological resource in and within the vicinity of the development area using appropriate methods of study.

Desk-based assessment is defined as a programme of study of the historic environment within a specified area or site that addresses agreed research and/or conservation objectives. It consists of an analysis of existing written, graphic, photographic and electronic information in order to identify the likely heritage assets, their interests and significance and the character of the study area, including appropriate consideration of the settings of heritage assets (IFAa 2012). In order to compile a complete baseline, a site inspection is carried out to complement the results of the desk-based assessment. In the case of underwater areas, site inspection is achieved through archaeological dive surveys. This leads to the following:

- Determining the presence of known archaeological heritage sites that may be affected by the proposed development;
- Assessment of the likelihood of finding previously unrecorded archaeological remains during the construction programme;
- Suggested mitigation measures based upon the results of the above research.

The study involved detailed interrogation of the archaeological and historical background of the development area. This included information from the Record of Monuments and Places of County Dublin, the Shipwreck database, the Dun Laoghaire Rathdown Development Plan, the topographical files of the National Museum of Ireland, cartographic and documentary records. A programme of marine geophysical survey was carried out during May 2014 in an attempt to identify any known archaeological, along with any previously unrecorded features and/or archaeological artefacts within the proposed development area. This was followed by a dive inspection of potential archaeological anomalies and then marine archaeological testing.

5.10.2 Methodology

Research for this report was undertaken in a number of phases. The first phase comprised of a paper survey of all available archaeological, historical and cartographic sources. This was followed by a landward field inspection of the proposed development area. A programme of marine geophysical survey of the harbour bed was then carried out including side-scan sonar and marine magnetometry survey, which was carried out by Geomara Ltd for IAC Ltd. This was followed by a dive survey targeting selected sites of potential, which was also carried out by Geomara Ltd. A second dive survey and the assessment of sites of interest through test trenching was then carried out. This phase of works was conducted by Archaeological Diving

Company (ADCO) for IAC Ltd. A final phase of marine geophysical survey was then carried out in February 2015 by Geomara Ltd for IAC Ltd.

5.10.2.1 Paper Survey

- Record of Monuments and Places for County Dublin;
- Sites and Monuments Record for County Dublin;
- Shipwreck database;
- Topographical files of the National Museum of Ireland;
- Cartographic and written sources relating to the study area;
- Dun Laoghaire/Rathdown County Development Plan 2010–2016
- Aerial photographs;
- Excavations Bulletin (1970–2014)

Record of Monuments and Places (RMP) is a list of archaeological sites known to the National Monuments Section, which are afforded legal protection under Section 12 of the 1994 National Monuments Act and are published as a record.

Sites and Monuments Record (SMR) holds documentary evidence and field inspections of all known archaeological sites and monuments. Some information is also held about archaeological sites and monuments whose precise location is not known e.g. only a site type and townland are recorded. These are known to the National Monuments Section as 'un-located sites' and cannot be afforded legal protection due to lack of locational information. As a result these are omitted from the Record of Monuments and Places. SMR sites are also listed on the DoAHG website – www.archaeology.ie.

Topographical files of the National Museum of Ireland is the national archive of all known finds recorded by the National Museum. This archive relates primarily to artefacts but also includes references to monuments and unique records of previous excavations. The find spots of artefacts are important sources of information on the discovery of sites of archaeological significance.

Cartographic sources are important in tracing land use development within the development area as well as providing important topographical information on areas of archaeological potential and the development of buildings. Cartographic analysis of all relevant maps has been made to identify any topographical anomalies that no longer remain within the landscape.

Documentary sources were consulted to gain background information on the archaeological, architectural and cultural heritage landscape of the proposed development area.

Aerial photographic coverage is an important source of information regarding the precise location of sites and their extent. It also provides initial information on the terrain and its likely potential for archaeology. A number of sources were consulted including the Ordnance Survey of Ireland.

Development Plans contain a catalogue of all the Protected Structures and archaeological sites within the county. The Dun Laoghaire-Rathdown County Development Plan (2010–2016) was consulted to obtain information on cultural heritage sites in and within the immediate vicinity of the proposed redevelopment.

Excavations Bulletin is a summary publication that has been produced every year since 1970. This summarises every archaeological excavation that has taken place in Ireland during that year up until 2010 and since 1987 has been edited by Isabel Bennett. This information is vital when examining the archaeological content of any area, which may not have been recorded under the SMR and RMP files. This information is also available online (www.excavations.ie) from 1970–2014.

5.10.2.2 Field Inspection

Field inspection is necessary to determine the extent and nature of archaeological and historical remains, and can also lead to the identification of previously unrecorded or suspected sites and portable finds through topographical observation and local information.

5.10.2.3 Marine Geophysical Survey

Remote Sensing surveys of the harbour bed were carried out in May 2014 and February 2015 by Geomara Ltd. These surveys included side-scan survey and magnetometry survey. For the side scan sonar survey, Geomara employed a Klein 3900 full spectrum chirp dual frequency side scan sonar was employed. It simultaneously transmits linearly swept FM pulses centred at two discrete frequencies. The two recordable frequencies were 100 and 445 kHz, all data was recorded at both 100 and 445 kHz. The normal operating range was 100m each side of the centreline. This was the optimum combination of range and resolution. The side scan sonar images the seabed with amplitude returns dependent on the nature of the seabed sediments or objects / debris on the seafloor. It is capable of imaging small objects of less than 0.2m and the QC geophysicist are able to map these and any changes in sediment. Full coverage in excess of 200% including the nadir of adjacent lines was required. The position of the Klein integrated sonar tow-fish was determined using a cable counter. The speed of the survey vessel did not exceed 5 Knots. Throughout the survey, the tow-fish was flown at a height above the sea floor, of approximately 10% of the range used. Geomara used a geometrics 882 caesium magnetometer for the marine magnetometer survey. It has a detection sensitivity of 0.004nT. The magnetometer was operated at a cycle rate of 10hz and towed at a distance of 35m off the starboard aft quarter of the survey vessel. This distance ensured that the sensor was not impacted by the magnetic signature of the survey vessel allowing for better data.

5.10.2.4 Archaeological Dive Inspections

The aim of the surveys was to investigate potential archaeological anomalies identified during the marine geophysical survey and their immediate surroundings. The dive survey was undertaken on the 3rd of September 2014 and involved the deployment of a weighted, buoyed line at the site of the anomaly. A diver then descended the weighted buoyed line to the seafloor. Upon arriving at the seafloor the diver then searched the area for the anomaly. This was achieved through the use of the circular search technique using a graduated line. Upon identification of the feature, the diver would then describe the nature and extent of the feature.

5.10.2.5 Archaeological Test Trenching

ADCO conducted a search of a wide area beside two locations of previously recorded wreck sites on the 26th of November 2014. The site of the diving operations was accessed from the dive support vessel. The Dive Control office was situated within the vessel, allowing all diving activity to be monitored by the Dive Supervisor directly and visually with the diver. Secondary and emergency exits from the water were provided for with the use of a secondary support

vessel (Zodiac inflatable) within the dive area, where agreed. An underwater metal-detection survey was carried out under licence and a number of test trenches were cut into the sea bed and scaled drawings were made of any remains.

5.10.3 Archaeological Heritage

5.10.3.1 Receiving Environment

The receiving environment is characterised by the harbour of Dun Laoghaire, which has dominated the area since its completion in 1842. The harbour is an important resource for both commercial activity and also as a civic amenity. The most substantial commercial activity taking place in the harbour was carried out by the Stena Line Ferry Company who ran a service from a dedicated facility for High Speed Ferries at Dun Laoghaire. This service has now ceased. The harbour is also widely used civic amenity as evidenced by the yacht marina, lifeboat station and public walkways along both the east and west piers.

The most sensitive archaeological resource associated with the proposed development area is that of marine archaeological remains, which for the most part, consist of the wrecks of ships. There are 165 ships recorded as sinking within or in close proximity to Dun Laoghaire Harbour that do not have a recorded location (Appendix 5.10.1). Five further wrecks are recorded within the harbour with precise co-ordinates. There are additional recorded ship wrecks in Dublin Bay, with no reference to the harbour but which may be within vicinity of the turning circle and channel of the proposed development.

Of the 165 ships, 23 ships recorded as sinking at the entrance to the harbour or close to the piers or heads of the piers; although locational information is not precise. A further 11 ships are recorded as sinking within a mile of the harbour entrance or else having been wrecked on the breakwaters of the pier outside of the harbour. There are two wrecks within the harbour that possess location references, which are either within or in close proximity to the proposed dredge channel and turning circle. These consist of Wreck W01966 – discovered by Marlin Sub Aqua Club in harbour entrance at ITM 691268.381 5909582.352 and Wreck W01967 identified during national sea bed survey inside of harbour entrance at ITM 691268.381 5909582.352 (Figure 5.10.1).

In addition there are two recorded archaeological sites listed within the Record of Monuments and Places within immediate proximity of the proposed development area, (Appendix 5.10.2). These consist of the site of a martello tower (DU023-052003) and the site of a possible promontory fort (DU023-052001), which were removed during the construction of the railway. These sites are located to the immediate north of the western part of the landward proposed development (Figure 5.10.1). Several stray archaeological artefacts that have been recovered from the wider area are listed in Appendix 5.10.3 (National Museum of Ireland: Topographical Files).

Prehistoric Period

The Mesolithic Period (7000–4000 BC) is the earliest time from which there is clear evidence for prehistoric activity in Ireland. During this period people hunted, foraged and gathered food and appear to have had a mobile lifestyle. Evidence for settlement during this period is rare. However, evidence for the exploitation of the coastline and the maritime resource in the late Mesolithic period has been found at various locations around Dublin Bay. A shell midden and

flint scatter dating to this period is known from Dalkey Island c. 3.45km to the south-east of the proposed development area. Mesolithic fish traps have also been found in the estuarine silts of the Liffey at Spencer Dock c. 9km to the north-west (McQuade 2008, 8–11; Bennett 2004:0565, Licence Ref.: 03E0654; Bennett 2007:494, Licence Ref.: 06E0668) while a Late Mesolithic shell midden of considerable size has been excavated directly across the bay at Sutton, c. 9.5km to the north (Mitchel 1972). It is likely that Dun Laoghaire was most likely a small sheltered inlet during this period, a landform that may have attracted coastal foragers.

The Neolithic period saw the introduction of farming and new stone technologies to Ireland. While there is no clear evidence for Neolithic activity within the proposed development area, it can be assumed that the area was inhabited during this period. Megalithic tombs are known from the surrounding areas including Killiney, Laughanstown, Ballyedmonduff in the foothills of the Dublin mountains. The site of once such Megalithic tomb is thought to have been located c. 1.5km to the south-east of the harbour at Albert Road, Glenageary (DU023 018). The construction of such tombs would have required a significant, organised population in the area and Dun Laoghaire with its access to a sheltered cove in the shoreline of Dublin Bay is likely to have attracted settlement.

Bronze Age (c. 2500–600BC) activity is commonly identified in the landscape by the presence of *fulachta fiadh* or burnt mounds. Over 4500 *fulachta fiadh* or burnt mounds have been recorded in the country making them the most common prehistoric monument in Ireland. There are no known fulachta fia within the vicinity of the proposed development area; however two cist burials are known from the wider area with one recorded at Stillorgan (DU023-06) c. 2.5km south-east and another at Deansgrange (DU023-042), c. 3km to the south.

Early Medieval Period (AD500–1100)

Settlement across County Dublin advanced during the early medieval period when the area now straddled the ancient kingdoms of Brega (north of the River Tolka) and Laigin (south of the Tolka). During this period, Ireland is depicted in the surviving sources as entirely rural. The Kingdom of Laigin would have been sub-divided into smaller territorial units, known as túaths (Stout 1997). Secular habitation sites in the early medieval period include *crannógs*, *cashels* and *raths* in addition to unenclosed settlements which are more difficult to identify in the archaeological record. The ringfort or *rath* is considered to be the most common indicator of settlement during the early medieval period. The ringfort is usually defined as a defended farmstead with a broadly circular enclosure delimited by a bank and ditch. Entrance to the sites was usually by means of a causeway across the ditch or in the case of platform ringforts, by means of a ramp. Entrances are often located at the south-east quadrant of the enclosure.

The term *dún* was usually used for any stronghold of importance, which may or may not be ring-shaped (Edwards 2006, 12). Dun Laoghaire therefore translates as "fort of Laoghaire" referring to Laoghaire Mac Néill, a 5th-century High King of Ireland. Laoghaire allegedly chose the area as a sea base from which to carry out raids on Britain and Gaul. It is believed that the *dún* was located immediately south of the site of the present Coal Harbour Bridge (DU023-052001). Two stones decorated with geometric patterns were recovered from digging in this area in the 1930s (NMI L 1932; 17, A, B., 18). One of these stones had been marked with ogham script which read "C L (?) A (?) U S". This site is located to the immediate north of the western part of the proposed development area.

The Dublin area was transformed by the arrival of the Vikings who had established themselves in Dublin by the middle of the ninth century and by the tenth century Dublin had become a recognised urban centre. The first Viking settlement within Dublin consisted of a longphort,

which was a semi-permanent Viking encampment used initially as a raiding base, but then developed over the succeeding 60 years into a commercial centre that was an important market place for slaves and luxury goods. The precise location of this settlement has remained somewhat elusive and both the current site of Dublin Castle and an area of Kilmainham close to the current Heuston Station have been proposed. However, this first phase of settlement only lasted until 902, when the Annals of Ulster record that the Vikings were driven away from Dublin. The Vikings returned to Dublin in 917 and established themselves in a new location overlooking the confluence of the Liffey and the Poddle in an area that stretches today from Christchurch Cathedral to Dublin Castle.

The establishment of a Viking kingdom at Dublin had a direct impact upon the hinterland of the town both north and south of the Liffey. To the north Scandinavian hegemony was established over much of Fingal. Place name evidence, archaeological discoveries and the distribution of Rathdown slabs indicate that the area surrounding Dun Laoghaire was under Viking control or, at least, subject to a strong Scandinavian influence. Rathdown slabs, named for the fact that they are only found at churches in the Barony of Rathdown, feature a distinctive type of decoration not found elsewhere in Christian Ireland. They are generally regarded as having been influenced by Viking art styles and as representing the burials of local Viking Christians (Corlett 2003, 30). The distribution of Rathdown slabs indicates the extent of Viking settlement in this area and excavations carried out at Cherrywood c. 4.5km south-west of the proposed development area uncovered archaeological evidence of Scandinavian rural settlement (Ó Néill 2006). A sheltered berth such as that offered by Dun Laoghaire is likely to have been utilised by Viking communities living within the strip of land between the Dublin Mountains and the shore of Dublin Bay.

Medieval Period (AD1100–1600)

After the Anglo-Norman invasion of Ireland in 1169, the medieval town of Dublin enjoyed a period of prosperity and development, which continued until the beginning of the 14th century. The Anglo-Norman administration was responsible for reinforcing the town walls with defensive towers. Further improvements to the defences involved erecting a number of gates on the built-up streets outside the walls and supplementing the defensive gates already in place along the town wall itself. It was also during this period that the first substantial reclamations of land occurred along the Liffey at Woodquay (Halpin 2000, 34). A programme of land reclamation from the River Liffey at Wood Quay and Exchange St Lower was initiated towards the end of the 12th century, as a part of the extramural development of medieval Dublin.

During this period, Dalkey was the principal port along the southern shore of Dublin Bay. An overland route for the transfer of goods from this port to the markets at Dublin presumably passed through, or close to the current town of Dun Laoghaire which may have existed then as a small fishing village.

One of the principal developments during this period was the establishment of numerous religious houses in Dublin. These monastic foundations were granted large landholdings in the hinterland of Dublin with which to generate revenue. These outlying farms were called granges and a number of such establishments were located within 3km of Dun Laoghaire including Monkstown, Kill of the Grange and Deansgrange.

Post Medieval Period (AD1600-1900)

Dun Laoghaire appears on Burgh's map of 1728, which shows a small village marked 'Dunlary' composed of fishermen's houses centred on an inlet and a stream flowing north from

Monkstown Castle. By this time, Dublin Bay had become badly silted up and dangerous to enter. Ships often had to await tides and winds to enter Dublin safely and while doing so moored on the coast off Dun Laoghaire. It became common practice for waiting ships to land their passengers ashore at Dun Laoghaire. This traffic of passengers resulted in the construction of a coffee house by 1750 which was built overlooking the inlet. A painting entitled 'View of the Coffee House at Dunleary' dating to the end of the 18th century shows a collection of gable-fronted buildings of 'Dutch Billy' type perched on an area of high ground overlooking the inlet (Pearson 1998).

Several accounts conjure the bustle and atmosphere of Dun Laoghaire at this time. In 1710, Dean Swift complained about the Dun Laoghaire boatmen who charged him double to row him quickly out to his ship, which they said was about to depart. When he got out to the ship, he found he had plenty of time. Day trippers came out from Dublin and the village was popular as a sea-bathing location. Some verses published around the 1720s invited the ladies of Dublin to repair to 'Dunleary' where they would find honest residents and could procure good ale.

As the approaches to Dublin Port became increasingly silted up and dangerous, Dun Laoghaire became more popular as a landing place. A petition was presented to the Irish Parliament in 1755 for building a pier. This was agreed to and Parliament voted £21,000 for this to be done. The pier was completed in 1767 with locally quarried granite under the supervision of Captain (later General) Charles Vallancey. The new pier quickly silted up and was no longer serviceable. It remains today as the Inner Coal Harbour Pier (De Courcy Ireland 2001).

On November 18th 1807, a serious storm resulted in the loss of 400 lives in Dublin Bay and led to a campaign for the construction of an asylum harbour. Howth, which had become the official mail-packet station in 1800 was selected as the preferred location for the asylum harbour and works began soon after (Pearson 1998). The silting of the harbour caused some controversy and the design was criticised in some quarters for being nothing more than a sand trap. Despite the fact that £350,000 had been spent on Howth, a proposal for a new harbour at Dun Laoghaire was mooted and by 1815, an act was passed 'to authorize the appointment of commissioners for erecting a harbour for ships to the eastward of Dunleary, within the port and harbour of Dublin'.

Dun Laoghaire Harbour was built between the years 1817 and 1842. The construction of the harbour was an immense undertaking and a dedicated quarry at Dalkey was developed for the purpose of obtaining sufficient granite for the structure. Teams of labourers were engaged at the quarry and also to transport the stone from the quarry to the pier side. This was achieved using a system of counterweighted trolleys. The descent of the fully loaded carriages provided the force to pull the empty carriages up-slope. During this period, the town itself was re-named Kingstown after the visit to the Harbour by George IV in 1821. The Harbour, and the railway that was built to service it, transformed the character of the small fishing village with the volume of traffic leading to the development of a suburban town. The significance of Dun Laoghaire as a port town was acknowledged in 1826 when the mail service was transferred from Howth. The development of the railway resulted in the first manifestation of suburban commuting in Ireland. Well-to-do civil servants, bank officials, merchants and tradesmen began availing of the train to commute to Dublin while returning in the evening to the growing and increasingly fashionable suburbs. Dun Laoghaire, with its seaside location, pier and port became a very attractive location for men of means.

Despite the protection of the harbour walls, the nature of shipping in the 19th and early 20th centuries resulted in persistent ship wrecks in Dublin Bay and also within the harbour itself.

There are 165 ships recorded as sinking in Dun Laoghaire harbour. There are additional recorded ship wrecks in Dublin Bay, with no reference to the harbour but which may be within vicinity of turning circle and channel of the proposed development.

This high number of shipwrecks recorded from the vicinity of Dun Laoghaire Harbour results from the harbour's status of an 'asylum harbour'. It was to Dun Laoghaire that ships threatened from high seas or adverse weather would retreat to. During storms, ships therefore converged on the harbour resulting in an increased number of wrecks. A particularly large scale storm happened in February 1861, which saw the wrecking or stranding of up to 40 ships in and around the harbour (Brady 2008).

Summary of Previous Archaeological Fieldwork

A review of the Excavations Bulletin (1970–2014) has revealed that a previous programme of archaeological monitoring was undertaken of dredging works within Dun Laoghaire harbour in 2003. In total, five areas were dredged, all adjacent to or coterminous with the current project area. This dredging was carried out to facilitate access to the harbour for the Stena Ferry 'Voyager'. A significant amount of modern material was encountered but nothing of archaeological significance was identified (O'Connor 2003).

A side-scan survey and a magnetometor survey were carried out as a part of this programme of works. A total of twelve anomalies were identified within or in proximity to the current proposed development area. The report arising from these works notes the possibility that 'quite a few of these targets are geological in origin' (Hydrographic Surveys Ltd 2003). Following examination of the survey results, the Heritage and Planning Division of the Department of Environment and Local Government recommended that these anomalies be 'diver truthed' prior to any dredging works taking place. A dive survey was carried out by CRDS in August 2003 (03D064). There were no archaeological features recorded during the dive survey. There were a number of 'hits' identified during the metal detecting survey but these hits yielded modern debris (03R117).

The development of a marine engineering, technical and administrative centre on the site of The Irish Lights on Dun Laoghaire Harbour in 2006 necessitated archaeological monitoring of groundworks. The foundation of the development consisted of piles and ground beams. The excavation of the piles down to bedrock was monitored, as was the site clearance works. No features of archaeological significance were encountered during monitoring (Bennett 2006:653, Licence Ref.: 06E0009).

As part of the current proposed development, site investigations were carried out in Dun Laoghaire Harbour in June 2014. These were subject to archaeological monitoring by Edmond O'Donovan. A total of three rotary cores and 12 bore holes were excavated during the project. No deposits or artefacts of archaeological potential were noted during the course of monitoring (O'Donovan 2014, *in lit.*)

Cartographic Analysis

John Rocque *An actual survey of the county of Dublin*, 1760

The inlet of Dun Laoghaire is clearly visible on this map (Figure 5.10.2). The original pier (titled "New Quay" on this map and now called the 'Old Pier') is under construction. A grant to construct this Pier was made in 1755 and it was completed in 1767, under the supervision of Captain Charles Vallancy. A cluster of buildings north of the cove indicate where the village was located. The coffee house of Dun Laoghaire is marked.

William Duncan *Map of the County Dublin,* 1821

Duncan's Map, published soon after George IV's visit to Dun Laoghaire names the town as 'Kingstown'. Both the east and the west pier were under construction at this time. Though not complete, Duncan has depicted the piers as fully constructed. The expansion of development along George's Street can be seen.

First Edition Ordnance Survey Map, scale 1:10560, Sheet 23, 1843

Both piers are in place with little internal division within the harbour. Proposed place of pier is marked along the harbour where the Yacht Club was later built. A 'truck railway' is marked along the line of the modern railway. The original inlet of Dunleary is named 'Old Harbour' while the old pier is now named 'Coal Harbour Pier' (Figure 5.10.3).

Ordnance Survey Map, scale 1:2500, 1909

Extensive remodelling and improvement of the harbour facilities has been implemented since 1843 (Figure 5.10.4). Two new short piers extending from the harbour promenade are visible on this map. These new piers are short and provide mooring posts for vessels along each side. The 'Coal Harbour Pier' is named the 'Dunleary Pier' on this map. A slip and a coastguard station have been constructed immediately north east of this pier. The Yacht Club, Lifeboat House and a further series of small slipways are visible further along the harbour towards the east. Breakwaters of large coursed blocks have replaced the rubble breakwaters at the extremities of both the west and east piers. A lighthouse has been built on both pier heads and the battery is annotated on the pier head of the east pier.

Dun Laoghaire-Rathdown County Develoment Plan 2010-2016

The Dun Laoghaire-Rathdown County Develoment Plan (2010-2016) was reviewed as part of this assessment. The development plan recognises the statutory protection afforded to all recorded monuments under the National Monuments Act. This protection also extends to ship wreck sites. There are two recorded ship wreck sites located in and within the immediate vicinity of the proposed dredging channel. These consist of Wreck W01966 – discovered by Marlin Sub Aqua Club in harbour entrance at ITM 691268.381 5909582.352. This site is located to the immediate east of the proposed dredge channel. Wreck W01967 was identified as a possible wreck site during national sea bed survey inside of harbour entrance at ITM 691268.381 5909582.352. This site is located within the footprint of the proposed dredge channel. Aims and objective relating to the archaeological resource are listed in Appendix 10.5.7 of this report.

Aerial Photographic Analysis

Inspection of the aerial photographic coverage of the proposed development area held by the Ordnance Survey (1995, 2000 and 2005) and Google Earth (2008) failed to identify any previously unrecorded features of archaeological potential in or within the immediate environs of the proposed development area.

Field Inspection

The field inspection sought to assess the proposed development area, its previous and current land use, the topography and any additional information relevant to the assessment. The field inspection of the landward side of the proposed development area was carried out on the 10th January 2014.

The main area of proposed landward works are located within the existing vehicular access area associated with the Stena berth (Figure 5.10.1). The area is characterised by hard landscaping and modern concrete walls all of which occupy a reclaimed area from the harbour. This area was formerly occupied by a small slip way, several cranes and crossed by a railway track that serviced Victoria Wharf to the immediate east, as marked on the 25 inch OS mapping. No trace of these features survive today.

A modern service building is located within the northern part of the development area (Figure 5.10.2) and to the immediate east the existing berth of the Stena ferry is present (Figure 5.10.3). Extending from the pier to the immediate north-west of the berth is a metal walk way that provides access to piers that have been placed in the harbour in order to assist the docking of the ferry (Figure 5.10.4). These features are located within the proposed dredge channel.

To the immediate north-west of the existing services building there is an area of quay side, with rock armour extending into the sea (Figure 5.10.5). This area is included within the proposed development area. A marina is located to the immediate west of this quay. The access area to the ferry berth and the marina are separated by a large concrete wall.

In the western part of the harbour, a small area is included within the proposed development area. This consists of a car park and access road – the useage of which will remain the same as part of the proposed development. The car park has been constructed on a small reclaimed area in the eastern corner of the 'Old Harbour'. The access road will run along a currently disused roadway that runs east-west parallel to the railway track. The road is flanked by cut granite walls and has a length of c. 265m. The site of a possible promontory fort (DU023-052001) and the site of a Martello tower (DU023-052003) are located c. 20m to the north of the access road. These sites were purportedly removed during the construction of the railway and presumably the harbour. No specific features of archaeological potential were noted within this area.

5.10.3.2 Marine Geophysical Survey

The survey was carried out on the 22nd of May 2014 by Geomara Ltd and for IAC Ltd, under licence number 13R73 (Detailed technical report and figures included in Appendix 10.5.4). It recorded 10.125 linear km of sidescan and magnetometer data, consisting of 16 lines. A total of 16 contacts (points of potential archaeological interest) were noted during the side scan sonar survey. The contacts which were noted were thought to possibly correlate with known wreck sites and other man made features. The southernmost contacts represent pilings and other structures associated with the existing berth. A cluster of contacts located in the central channel were thought to relate to the known wreck WO1967. One contact located in the central channel at the entrance to the harbour, was thought to be associated with the known wreck W01966. The area outside the harbour walls, the 'turning circle', did not show any contacts on the sonar traces.

The magnetometer survey recorded possible evidence of three anomalies which were interpreted as likely to represent cultural heritage material. These were:

1. The area surrounding contacts associated with recorded wreck W01967 in the main channel.

2. The anomalies close to the mouth of the harbour and just inside the mouth of the harbour.

3. An anomaly close to the navigation marker at the entrance to the approach channel.

Following the geophysical survey, it was recommended that a dive survey be carried out in the areas where magnetic anomalies and sidescan sonar contacts were noted in order to determine their nature, age and extent. It was further recommended that this be undertaken by a team of archaeological divers, subject to the approval of the Department of Arts, Heritage and Gaeltacht.

5.10.3.3 Archaeological Dive Inspection

Informed by the marine geophysical survey 13R73, Geomara Ltd undertook a dive inspection of the potential archaeological anomalies to confirm their nature and extent. The dive inspection (14D14) was carried out on the 3rd of September 2014 (Detailed technical report and figures included as Appendix 5.10.5).

The anomalies to be dived comprised 11 sites; two feature clusters (Pilings, **DL CH 01-04,** Possible Wreck W01967 site, **DL CH 07-10** and possible Wreck site W01966). As these clustered features were located close by they were each investigated under one dive. The remainder of the anomalies were investigated under individual dives.

DL CH 01-04

Anomalies DL CH 01 – 04 were mooring dolphins associated with the Stena HSS ferry berth. They were not archaeological in origin.

DL CH 05

This anomaly was situated to the east of the Stena HSS ferry berth and consisted of a 63m long linear feature of variated width. A 50m circular search was carried out in this area and it identified the seafloor anomaly as most likely being a seafloor scar. The dive did not record the presence of any cultural heritage feature in this area.

DL CH 06

This anomaly was also located to the east of the Stena HSS ferry berth. The side scan sonar image indicated that this was a 3.7m diameter seafloor hollow. Again, a 50m circular search was carried out in this area. The survey recorded seafloor variations but there was no visible trace of any cultural heritage features. It is most likely that this was an acoustic artefact and not a physical anomaly.

DL CH 07-10

These features were positively identified as possible shipwreck remains consistent with the location of recorded Wreck WO1967, which is located within the proposed dredge channel. The scattered site lay directly in the centre of the channel inside the mouth of the harbour. At the time of the survey the remains appeared to comprise the scattered remains of a shipwreck orientated in a roughly north-south direction and contained within the silty gravel upper horizon of the harbour bed. The Dive Inspection recorded that the wreck remains appeared to be scattered over a 25m (north-south) by 15m (east-west) area. They consisted of some possible outer structural members and some internal fittings. An exposed section of what appeared to be a section of gunwale measured 8.2m in length and was exposed to a depth of 0.2m. There was no obvious signs of internal cargo, however visibility at the time of the survey was poor (c. 2-3m). Dating of the site was not possible. The Maritime Sites and Monuments Record does not provide a name or date of loss for the wreck recorded as WO1967. The dive survey did not record the presence of any obviously datable material on the site. The dive inspection recorded that the feature was a possible shipwreck located in the centre of the navigation channel into the harbour.

DL CH 11

This anomaly was located inside the harbour mouth and comprised a series of two parallel acoustic shadows, each measuring 3.7m in length and 0.8m apart. A 50m circular search survey was carried out on this area. The survey recorded seafloor variations but there was no visible trace of any cultural heritage features. It is most likely that this was an acoustic artefact and not a physical anomaly.

DL CH 12

This anomaly was located in the centre of the two pier roundheads. It comprised a roughly circular anomaly that measured 3.7m in diameter. A 50m circular search survey was carried out on this area and no anomaly was noted. It is most likely that this anomaly was an acoustic artefact and not a physical anomaly.

DL CH 13

This anomaly was located outside the harbour mouth. It comprised a single linear acoustic shadow, measuring 4.6m in length and 0.3m in width. A 50m circular search survey was carried out on this area and no anomaly was noted. It is most likely that this anomaly was an acoustic artefact and not a physical anomaly.

DL CH 14

This anomaly was located outside the harbour at the eastern end of the navigation approach channel. The diver survey on this site did not record the presence of any feature at the location. A mooring chain and anchor associated with a nearby navigation buoy was identified to the north of the location. It is most likely that this feature may be the ensonified anomaly. This mooring chain and anchor were clearly not of archaeological significance.

DL CH 15

This anomaly was located to the south of the previous mooring chain, on the eastern end of the proposed outer harbour approach channel. The side scan sonar image indicated that this was a 95.3m long undulating seafloor anomaly. A 50m circular search survey was carried out on this area. The survey recorded seafloor variations but there was no visible trace of any cultural heritage features. Further review of the feature based on the results of the dive survey indicates that this may have propeller wash caused by a passing vessel. Consequently, it is most likely that this was an acoustic artefact and not a physical anomaly.

DL CH 16

This anomaly was positively identified as a navigation marker. It had a chain descending to the seafloor and a buried anchor.

Wreck W01966

This feature lay to the east of the immediate impact zone of the development and was not ensonified during the archaeo-geophysical survey. It was however located immediately adjacent to the proposed site and there was potential that remains may be buried within the development area. The dive survey concluded that it comprised a series of disarticulated metal beams, girders and plates, with no discernible complete hull structure noticeable. The metallic remains were noted adjacent to, interspersed with and overlying the stone of the east Pier. The remains appeared to be scattered over an area of 28m on the gravel seafloor and the angular rock. However, no definitive hull outline was identifiable. These wreck remains were located at the position of recorded Wreck WO1966. Although there were no materials directly identifying

the site as that of WO1966, the recording of the wreck remains in the immediate vicinity of the known wreck site appears to indicate that this was the site.

The sites of the two wreck remains (W01966, W01967) appear to be scattered wreck sites. Wreck remains W01967 is contained within the development zone, whilst wreck remains W01966 are contained adjacent to the development zone. Both sites are recorded shipwrecks, as such; the wreck, its remains and any associated material is protected by the National Monuments Act. It was recommended by Geomara that further archaeological investigations be carried out in the form of marine archaeological testing in order to assess the extent of potential buried remains associated with the wreck sites.

5.10.3.4 Archaeological Test Trenching

Archaeological dive inspections and testing was carried out by ADCO on 26th of November 2014 under licences 14E0441, 14D0045 and 14R0130. Dive work commenced in order to locate and test the recorded wreck sites W01966 and W01967 (Detailed technical report and figures is included as Appendix 5.10.6).

W01966

No indication of wreckage at the charted wreck location, to the immediate east of the proposed dredge channel, was encountered during the initial dive. The immediate vicinity of the charted location was searched as was the pier head and also the eastern half of the harbour entrance but the wreck site W01966 was not identified. However, when the search area was extended to the east, the recorded site (W01966) was discovered. The wreck site was identified by observing two pieces of corroded iron lying at the base of the East Pier's rock armour, and within metres of a small exposed section of timber, all of which is centered on 691495E 5906822N (UTM 29N) / 324975E 229681N ING, some 85m east of the charted location for the wreck site.

An archaeological test trench was opened over the remains noted and revealed that substantial remains lie buried close against the toe of the East Pier's rock armour. It was not possible to confirm the northern extension of wreckage. The wreck is that of a timber vessel of considerable size.

There are records of several shipwrecking events at the mouth of Dun Laoghaire harbour close to the East Pier, but perhaps the most dramatic was that of the *Neptune*, which was lost along with several ships during a ferocious storm on the 9th February 1861. The *Neptune* was a 118-ton brig with a cargo of coal that struck rocks in a north-east Gale Force wind and was stranded. Attempts to rescue her crew are illustrated on an engraving that was published in the *Illustrated London News*, showing Captain Boyd of *HMS Ajax* and some of his crew extending a lifeline from the shore to the stricken *Neptune*. Boyd and five of his crew, along with five of the six-man crew of the *Neptune* died in the event. The harbour was newly built at the time, the East and West Piers having been completed in 1842, but the size of the harbour's entrance was larger than had been advised, which left vessels vulnerable to northeasterly storms.

W01967

Dive work commenced to locate wreck W01967, located within the proposed dredge channel, by positioning the dive boat over the location of W01967 recorded in Geomara's marine geophysical survey report. A circular search on the seabed was undertaken, extending out 15m from the target location (Dive 1) but no wreckage was identified. The seabed was observed to

be generally flat with a low undulation and with a surface level of silt that blankets a harder gravel some 20cm below.

The search area for W01967 was repositioned to the charted location as recorded by the INSS in 2004. The seabed was more undulating and a slight hollow was encountered to the west of the target location. One encrusted feature was observed, while probing located a hard buried object. This led to the excavation of two investigation trenches, but neither feature was identified as being archaeological in nature; the former being an abandoned fish box, the latter an isolated boulder. A metal-detector survey also failed to return any anomalies. Additional inspections of the seabed were made, extending the search area in all directions, and including the location of a wrecksite that is recorded on the Admiralty Chart 60m east-southeast of W01967. No evidence for wreckage was observed during these additional searches.

Two further approaches were used to locate a potential archaeological anomaly at this location. Firstly it was possible to use the *Keary's* onboard sonar, but the sonar imaging indicated that the nature of the seabed would not generate a coherent image. No features were observed from this work that indicated wreckage. Secondly, a grapple survey was conducted from the surface. The grapple survey covered a much greater area but focused on the charted location, with the purpose of snagging any feature and diving the snag to determine its origin. However this approach also failed to identify any material.

The report concluded that actual location of W01966 lies 87m from potential impact associated with the proposed dredging works, which is associated with the top of the proposed dredge slope. Although it is likely that still-buried remains of the wreck await discovery, it is unlikely that sections of articulated remains would extend to within the proposed impact area.

The survey work did not locate wreckage associated with the record for W01967. Following the work completed at the charted location, it may be concluded that there will be no impact on wreckage here, as no remains exist. A question does remain in relation to W01967. The present work did not locate material at the charted location, and this is at variance with the record of inspection conducted in September 2014.

As a result of this survey, a second phase of geophysical works were commissioned in order to assess the location of W01967 (section 5.10.4.4 below)

5.10.3.5 Phase 2 Marine Geophysical Survey

A second programme of marine geophysical survey was carried out at Dun Laoghaire Harbour on 2nd February 2015 and comprised a side scan sonar survey under licence number 14R0049 (Detailed technical report and figures is included as Appendix 5.10.6). The objective of the second phase of survey work was:

1. To compare the seafloor topography and form with that recorded in May 2014, and;
2. To ensure that there were no further archaeological materials present in the area.

High resolution marine geophysical equipment, namely a Klein 3000 side scan sonar used to survey the development area. This ensured that the specific area of seafloor to be impacted was comprehensively surveyed and that any potential cultural heritage therein would be identified.

A total of 3.193 linear km of seabed was ensonified during the survey, comprising eight no. separate lines. The quality of the side scan sonar data was generally good although there was

propeller wash noted in some of the sonar traces. The data also indicated the presence of a number of water column features such as a shoal of fish and trawl marks on the seafloor.

The survey data indicated that the area surrounding the site of potential wreck WO1967 (anomalies DL CH 07-10) had changed considerably since the first geophysical survey was carried out in May 2014.

The most significant aspect of this change was the flat nature of the seafloor, where it had previously been scoured. A number of the seafloor anomalies noted in this area were still present. These were recorded during diver investigations as modern debris and small seafloor undulations and not of archaeological significance.

The previously recorded undulating seafloor typified by scour ridges were no longer present. These undulations appear to have been caused by ferry traffic. As ferry transits had ceased from the time of the geophysical survey to the time of the investigations, the seafloor has subsequently naturally silted in the areas of scour.

With regard to the previously recorded timber, it is most likely that it has been relocated. At the time of the survey, the provenance of this partially buried timber was indeterminable. Its subsequent disappearance appears to indicate that it may have been a piece of transient timber or flotsam, which has since been relocated, most likely as a result of shipping movements.

The previously undertaken archaeological investigations have shown that there were not any *in situ* archaeological features in this area. Consequently, the timber is not related to any archaeological features in this area and no remains of the possible wreck W01967 are present.

The side scan sonar survey indicates that there are no new seafloor anomalies in this area which may indicate the presence of archaeological features or material.

5.10.4 Archaeological Impacts and Mitigation

5.10.4.1 Potential Impact of the Proposal

- Recorded wreck site W01966 has been identified c. 85m east of the edge of the proposed dredge channel and at the foot of the east pier rock armour. No direct impact is predicted upon the remains as a result of the proposed development. However, it is possible that after the establishment of the new dredged channel, that boat wash, and thus secondary erosion, associated with the passage of vessels may impact on the remains of wreck W01966.
- It is possible that boring through the sea bed as part of the construction of the proposed new berth, and disturbances associated with the dredging of the new channel and turning circle, may have a direct adverse impact on the buried remains of ship wrecks and/ or archaeological artefacts that have the potential to survive in and within the vicinity of Dun Laoghaire harbour.
- Whilst no major ground disturbances are anticipated in association with the landward side of the development, it is possible that any significant ground disturbances may have a direct adverse impact archaeological features or deposits that survive beneath the reclaimed area with no surface expression. This includes the area surrounding the recorded site of a promontory fort and Martello tower (DU023-052001/3).

5.10.4.2 Do Nothing Impact

If the proposed scheme were not to proceed there would be no negative impact on the archaeological or cultural heritage resource.

5.10.4.3 Predicted Impact of the Proposal

Recorded wreck site W01967 was not found to be present during the phases of underwater archaeological investigation that was carried out as part of this assessment. As such no direct impact is predicted as a result of the proposed development.

5.10.4.4 Worst Case Impact

Under a worst case scenario, the proposed development would disturb previously unrecorded and unidentified archaeological deposits and artefacts without proper excavation and recording being undertaken.

5.10.4.5 Mitigation Measures

- It is recommended that a dive inspection of both the charted and identified wreck site W01966 is carried out 12 months post the dredging of the new channel, in order to monitor the condition of the remains and whether changes in the sea bed are having an adverse impact on either area. This should be carried out by a qualified marine archaeologist under licence to the Department of Arts, Heritage and the Gaeltacht.
- It is recommended that all marine boring and dredging works be subject to full time archaeological monitoring. This should be carried out by a qualified marine archaeologist under licence to the Department of Arts, Heritage and the Gaeltacht. Full financial and programming provision should be made for the resolution of any archaeological remains that maybe discovered, if that is deemed to be the most appropriate manner in which to proceed.
- It is recommended that should any landward ground disturbances exceed 0.4m in depth that archaeological monitoring be carried out. This should be undertaken by a suitably qualified archaeologist. Full financial and programming provision should be made for the resolution of any archaeological remains that maybe discovered, if that is deemed to be the most appropriate manner in which to proceed.
- No further archaeological mitigation is deemed to be necessary in relation to wreck site W01967.

5.10.4.6 Monitoring

The mitigation measures recommended above would also function as a monitoring system to allow the further assessment of the scale of the predicted impacts and the effectiveness of the recommended mitigation measures.

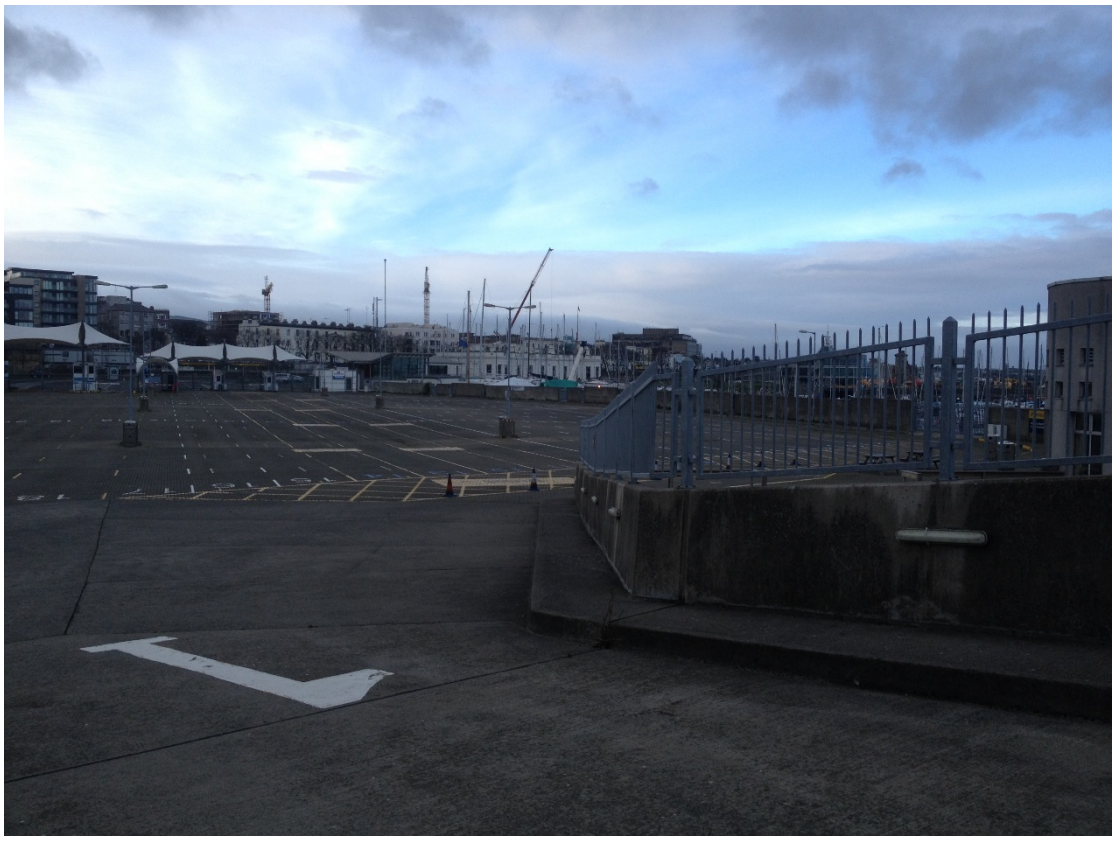

Figure 10.5.1 – Landward area of the proposed development, facing SSW

Figure 10.5.2 – Modern building within the development area, facing north

Figure 10.5.3 – Existing Stena berth, facing west

Figure 10.5.4 – Existing berth and walk way, facing ENE

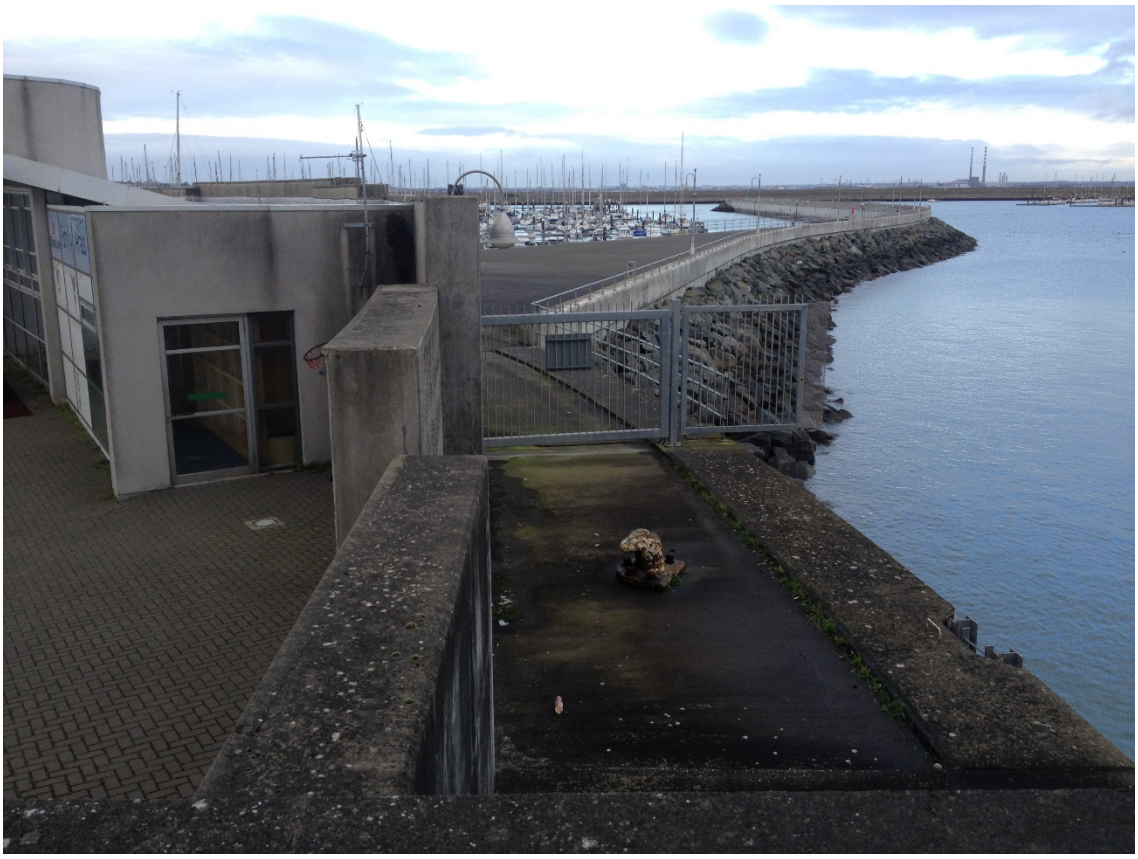

Figure 10.5.5 – Section of modern quay within the development area, facing WNW